# Staff Report Item 13

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| **To:** | Ava Community Energy Authority |
| **From:** | Dan Bertoldi, Electrification Program Manager |
| **Subject:** | Update on the results of the Health-e Communities Pilot (Informational Item) |
| **Date:** | April 15, 2026 |

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## Summary/Recommendation

It is recommended that the Board of Directors receive a presentation on the results of the Health-e Communities pilot. This is an information item and no action is required.

## Analysis and Context

### Executive Summary

The Health-e Communities pilot ("Pilot") was a kitchen stove electrification pilot program targeting low-income customers that measured indoor air pollution impacts of removing gas stoves. The Pilot used a "direct installation" program delivery model, which means Ava covered all costs associated with the installation (equipment and labor) with no cost to the customer. Ava also coordinated the temporary installation of indoor air quality monitoring. Indoor air quality monitoring was conducted before and after each installation of an all-electric induction stove to measure indoor air pollution levels within the participant's living space.

Applications for the Pilot ran for approximately one year, from October 2024 to September 2025. Marketing efforts included direct outreach to approximately 56,000 income-qualified Ava customers via email to meet the goal of installing 200 electric induction stoves. Of that goal, 162 projects were successfully completed with an average cost of over $7,000 per project. Despite the low conversion rate from marketing efforts, overall customer satisfaction remained high for those who did participate, even with longer than anticipated project completion timelines averaging 90 days.

At the end of the Pilot, staff concluded that it did not demonstrate a delivery model that is scalable, given the low conversion rate and the high costs resulting from equipment cost, administration costs and long installation timelines. Although the air quality study on the impact of removing gas stoves shows promising results for reductions in a key pollutant - nitrogen dioxide (NO2), which is known to cause negative health effects - more research is needed to understand the impacts of this change. Further understanding would require expansion of the health-focused scope to accommodate additional research, resulting in significant additional resource requirements, logistical complexity, and customer burden for each project, further hindering scalability.

During the Pilot, staff identified key barriers to electrification projects that go beyond stove electrification, which are further detailed in this report. Staff will take the learnings from the Pilot and apply it to future planning for program development.

**Background and Introduction**

At its November 2022 meeting, the Board of Directors directed staff to develop a program proposal to deploy home electrification, specifically induction technology, to Ava customers with a focus on human health. In October 2023, Ava secured a grant totaling $164,000 from the US Energy Foundation to support indoor air quality research efforts to support the Health-e Communities pilot. In February 2024, Ava executed an agreement with Berkeley Air Monitoring Group to provide indoor air quality monitoring services.

At its April 2024 meeting, the Ava Board of Directors approved staff's recommendation to adopt a resolution authorizing the CEO to execute a contract with Franklin Energy. On July 10, 2024, Ava and Franklin Energy entered into an agreement with a not to exceed amount of $1.5 million to implement the Pilot, with a term ending on December 31, 2025. On October 1, 2025, Ava officially launched the Health-e Communities pilot and outreach campaign, with Ava leading marketing efforts for outreach and recruitment.

The Pilot set out to achieve the following objectives:

- Complete up to 200 induction stove retrofit projects
- Develop and refine effective program recruitment and enrollment tactics for a direct installation program
- Gain insights into direct install program management strategies for electrification
- Solicit Pilot feedback from all participants
- Conduct analysis of indoor air pollutant concentrations and impacts of cooking electrification for all participants
- Inform on larger programmatic effort linking electrification and health

### Approach

Customer eligibility for the Pilot was limited to income-qualified Ava customers. To qualify, customers had to be enrolled in either the California Alternative Rates for Energy (CARE) or Family Electric Rate Assistance (FERA) programs – or reside in a home that is designated as affordable housing. Both homeowners and tenants were eligible to apply, but property owner permission was required for tenant-occupied homes. Additionally, single-family homes or multifamily buildings with 4 units or less were eligible.

The Pilot's outreach campaign focused on customers living in areas with the highest asthma rates. Staff utilized the State's CalEnviroScreen 4.0 to identify the target segments and, using Ava's customer data, identified CARE and FERA customers living within those target areas. In total, Ava reached out directly to approximately 56,000 residences between four to five times each to let them know about the Pilot. Marketing materials were provided in both English and Spanish.

Once a customer applied and was deemed eligible to participate, Franklin Energy provided in-home site assessments to determine the project's eligibility and install the air quality monitor for projects that were eligible. After at least one week of air quality monitoring, a contractor would install the induction unit and remove the gas unit. Franklin Energy returned to the home after another week of monitoring to retrieve the monitor and conduct an exit survey.

The air quality study component of the Pilot consisted of measuring four pollutants in the kitchen: nitrogen dioxide (NO2), fine particulate matter (PM2.5), carbon monoxide (CO), and carbon dioxide (CO2). Indoor air quality monitors were placed in participant's kitchens for at least one week before and after each installation. Additionally, each participant was asked to fill out a questionnaire detailing their stove use habits and other factors that would affect study results. Participants were provided with a personalized indoor air quality report at the end of each successful monitoring period.

## Results

Results across marketing and customer recruitment, direct installation, and air quality are listed below, with key pilot observations and lessons learned.

### Marketing and Customer Recruitment

- Of the 56,000 customers reached through the pilot, less than 1% applied after four or five email attempts per customer (518 application submissions).
- Out of over 200K emails sent, the email open rate was 11%, while the click through rate was 0.66%. The application rate per email was 0.24%.
- 87% of application submissions met the basic customer eligibility criteria for a total of 451 eligible applicants.

### Direct Installation Performance

- A total of 162 projects were successfully installed out of the goal of 200 (85% of the goal).

- On average, customer satisfaction was 9.9/10 out of 161 participants surveyed.
- Total applicant attrition rate (i.e. all applicants who applied that did not move forward) was 69%, with 356 of 518 applicants not moving forward.
- The eligible applicant attrition rate (i.e. eligible participant dropout, or number of customers who applied and were approved for an assessment) was 64%, with 289 of 451 projects dropping off for various reasons.
- The average installation took approximately 75 days to complete, from application approval to install.
- The average project completion took approximately 90 days, from application approval to final site visit and exit survey.
- The average cost per project for all labor, equipment, and administration was $7,110.
- The customer benefit value was approximately $5,000 on average for direct labor and equipment.

**Air Quality Impacts**

- Considerable reductions in nitrogen dioxide ($NO_2$) with most homes experiencing some level of $NO_2$ decrease.
    - The overall median concentration decreased by 70%, suggesting that large improvements were common across participants, not driven by a small number of outliers.
    - 98% of the study homes experienced a decrease in the number of minutes per day (median of 13 minutes/day to 0 minutes/day) that $NO_2$ concentrations exceeded 101 ppb, the US EPA threshold above which exposures are considered unhealthy for sensitive groups, including children.
- Reductions in carbon monoxide (CO) were moderate, showing an overall median CO concentration decreased by 17%.
- Carbon dioxide ($CO_2$) remained stable.
- Changes in particulate matter ($PM_{2.5}$) was variable, with a slight observed increase, although results were not statistically significant.

## Key Pilot Observations

Staff summarized key observations to preserve learnings from the pilot.

**Interest levels.** Even with a high value offering ($5,000 value to the customer), the Pilot faced lower than anticipated interest and high attrition for eligible customers that applied (64% attrition for eligible applicants). While specific reasons for participant drop out were often documented, some customers did not provide a reason. Additional market research could be useful to better understand why participants are not interested in a high value offering.

**Timelines.** The average project timeline of 90 days was largely attributed to logistical complexity, permitting timelines, and customer scheduling.

**Project scoping.** Almost half of projects required installation measures beyond “standard project”, meaning contractors had to provide other install services in support of the induction range installation, circuit run, and permit (i.e. tandem breakers, circuit sharing devices, etc.), resulting in higher program costs.

**Electrical infrastructure and panel issues.** A major contributing factor for the high attrition rate was existing electrical infrastructure issues. Nearly one quarter of homes that were assessed did not move forward because of either unsafe panels or panel capacity issues. Staff observed that electrification was not possible in the Pilot for range installation projects where the home had less than 100 amps of total panel capacity.

**Air quality impacts.** With the significant reduction in NO2 observed in the Pilot and given the latest research linking NO2 to pediatric asthma, a positive health outcome is likely attributable to stove electrification. However, more research is needed to understand the true impacts of human exposure to gas stoves.

**Key Lessons Learned**

Staff summarized lessons learned and will apply these key lessons for further program planning and execution.

One key learning focuses on permitting for a 240V circuit run/range installation, which was highly variable across permitting agencies in terms of requirements and timelines. Ample buffer time should be included in projected project timelines to allow for permit timeline flexibility, sometimes up to 4 weeks.

Related to permitting are learnings related to existing electrical infrastructure. Issues including panel capacity and unsafe electrical/panel conditions were common and should be considered when planning for attrition and delays, especially when targeting hard to reach communities. Adding a panel replacement measure would substantially decrease attrition, but at a high cost. Additionally, when permits are required, there should be consideration that additional code compliance issues - unrelated to the scope of the program - could be uncovered at homes/sites by the inspecting agency, which could then trigger project delays and increased costs.

One possible way to avoid permitting, electrical capacity, and equipment eligibility holdups is to consider virtual in-home assessments at the beginning stages of each project. This could reveal unsafe or insufficient panels, ineligible equipment, or other factors that would prevent a project from moving forward and reduce the amount of staff time on projects that are ineligible.
Other program offerings available to Ava customers, such as the State’s Equitable Building Decarbonization program, may fill the need for a direct installation approach for induction stoves. These programs couple induction stove installation with other electrification measures like heat pump HVAC and water heater installation, and provide a greater impact for decarbonization, while streamlining administration.

## Conclusion

The Health-e Communities pilot model did not demonstrate a scalable, cost-effective model that could serve a broad segment of Ava's customers. Adding further complexity with more invasive health-based research methods would further impair the viability of a large-scale program. Staff plans to take the learnings and data gathered in this pilot and apply it to future program planning efforts.

## Financial Impact

As part of the annual budget adoption process for FY 2023-24 and FY 2024-25, the Board of Directors approved a total allocation of $10 million for an induction stove program in the Local Development fund.

At its April 2024 meeting, the Board of Directors authorized the use of $1.5 million from the Local Development fund to pay Franklin Energy Services to provide induction stove installation services to support the Health-e Communities pilot. A total of $1,152,179 of Local Development funds was spent on Franklin's implementation services over the term of the pilot. Air quality monitoring services, provided by Berkeley Air Monitoring Group, were covered by the US Energy Foundation, which cost a total of $119,523.

With the closing of the pilot, the remining $8.85M funds will be reallocated within the Local Development fund for future programs.

## Attachments

A. Presentation

Ava Community Energy

# Health-e Communities Update
# Board of Directors
# April 15, 2026

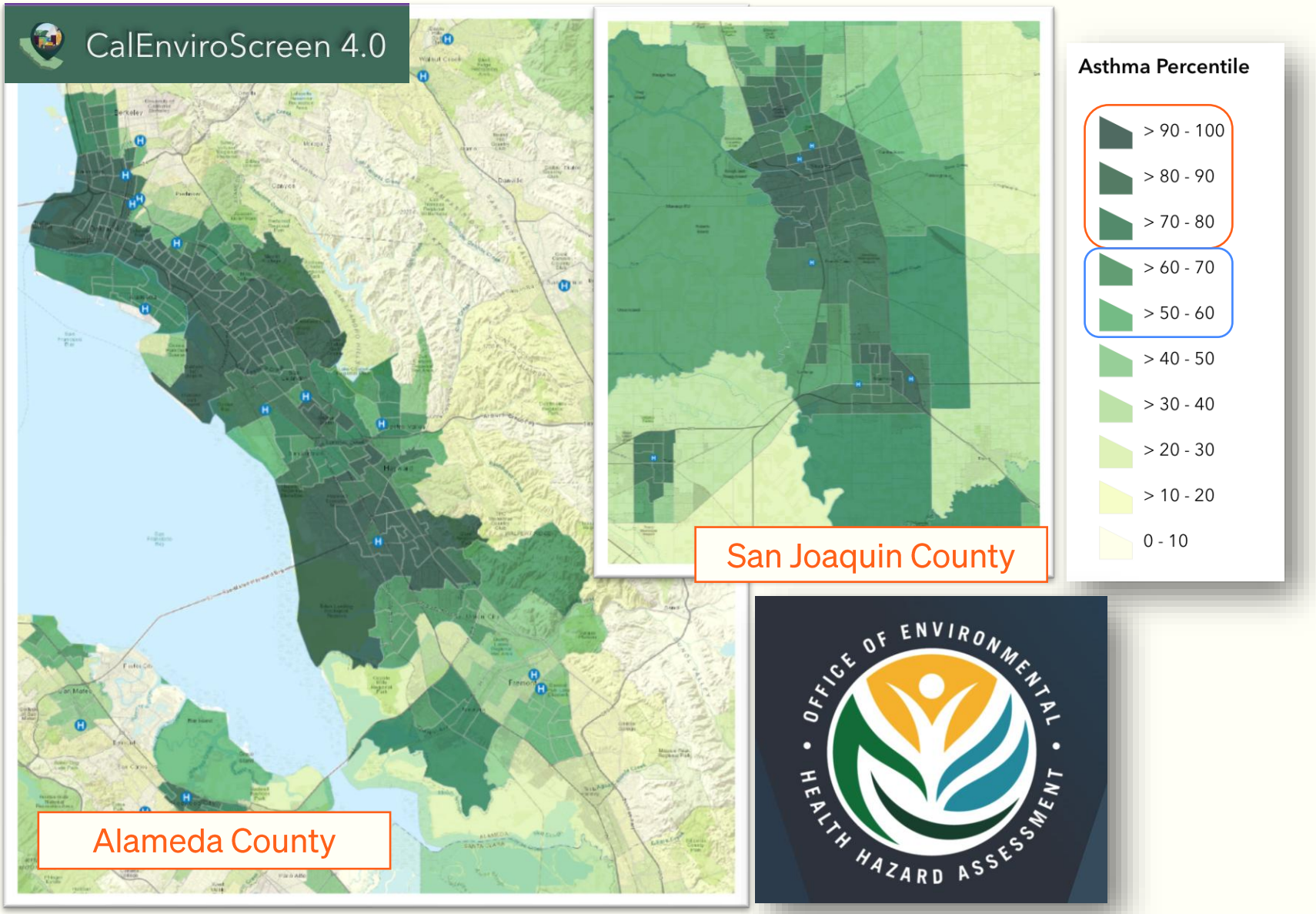
# Health-e Communities Pilot Approach


- The Pilot offered induction stove installation for income qualified customers and measured air quality impacts
- Pilot objectives:
  a. Measure indoor air pollution impacts for each stove installation
  b. Test how to build a viable and scalable program using a direct installation delivery model for installing building electrification measures
  c. Gain insights into electrification program delivery through data collection (e.g. panel capacities, customer interest, etc.)
  d. Determine viability to scale pilot to a larger program
- The Pilot ran from Oct. 2024 – Sep. 2025
- The total cost of the Pilot was $1.25 million for both implementation and air quality monitoring
- The Pilot required a high level of effort from Ava and vendors to deliver results (6 organizations and 2 Ava staff)

# Pilot Results Summary

- 162 units installed across 15 jurisdictions
- Significant learnings were gained:
  - **Indoor air pollution impacts:** Promising results for reduction in nitrogen dioxide ($NO_2$) - known to impact human health; variable impacts to other indoor air pollutants
  - **Project timelines:** 90 days to project completion, permitting on widely variable timelines across jurisdictions, permit timelines varied from 0 - 65 days
  - **Panel and Electrical Insights:** 22% of assessed homes were ineligible due to unsafe electrical conditions or insufficient panel capacity
  - **Project Costs:** $5K per installation, $7K per project including administration.
  - **Customer interest:** 0.24% application rate; 35% of applicants cancelled due to lack of interest or were non-responsive
- The Health-e Communities pilot did not demonstrate a delivery model that is scalable given low uptake rate and high costs

# Marketing and Recruitment




**Staff used the following criteria for targeted email outreach:**

1. **Active Ava customers**
2. **Verified enrollment in CARE or FERA programs**
3. **Located in areas with the highest asthma rates**
   - Utilized the CalEnviroScreen 4.0 Asthma indicator
   - Began in areas in the 75$^{th}$ + percentile
   - Expanded outreach to 50 – 75$^{th}$ percentile
   - 56k (47% of CARE accounts) were emailed

# Pilot Process and Average Project Timeline

# Permitting Timelines

| Jurisdiction | Avg Days to Approve Permit | Median | No. of Installs | Min | Max |
|---|---|---|---|---|---|
| Berkeley | 31 | 29 | 10 | 7 | 58 |
| Albany | 30 | 30 | 1 | 30 | 30 |
| Newark | 29 | 29 | 1 | 29 | 29 |
| San Leandro | 27 | 29 | 12 | 3 | 65 |
| Pleasanton | 22 | 22 | 1 | 22 | 22 |
| Union City | 14 | 15 | 3 | 0 | 26 |
| Emeryville | 9 | 9 | 1 | 9 | 9 |
| Lathrop | 9 | 9 | 1 | 9 | 9 |
| Uninc. Alameda Co. | 9 | 6 | 3 | 6 | 15 |
| Hayward | 8 | 6 | 16 | 0 | 30 |
| Stockton | 6 | 3 | 33 | 1 | 20 |
| Fremont | 3 | 0 | 17 | 0 | 28 |
| Tracy | 1 | 1 | 3 | 1 | 1 |
| Oakland | 1 | 0 | 58 | 0 | 20 |

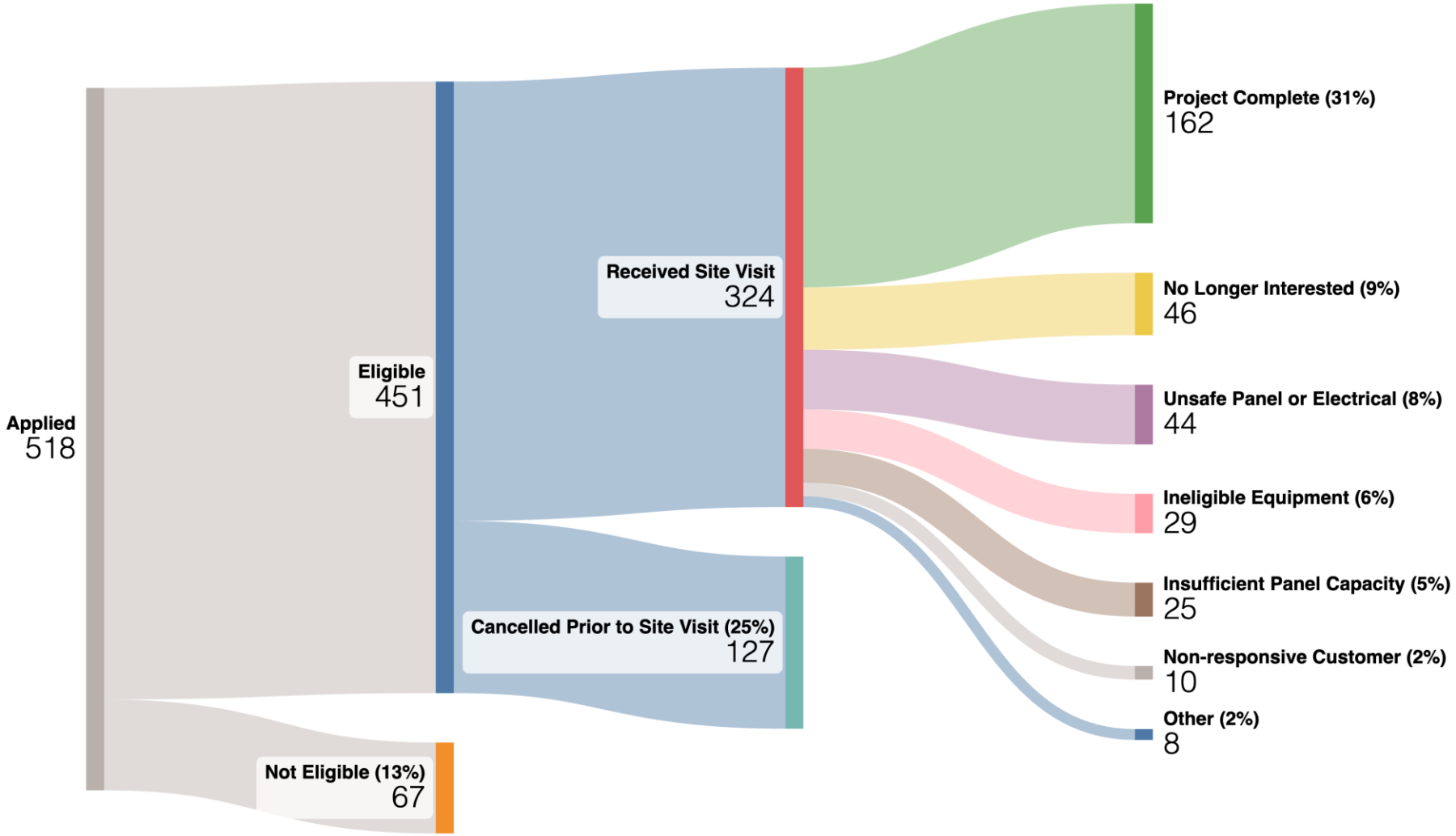
## Highlights

- High degree of variability between jurisdictions
- Most projects required electrical permits for 240V circuit runs
- Average project permitting wait times was 8 days
- Reasons for permitting variation:
  - Permit center backlogs
  - Jurisdiction-specific requirements requiring more time and coordination
  - Inspector availability

# Applicant Attrition Breakdown

Attachment Staff Report Item 13A

- 212k emails sent to 56k accounts ( 47% of CARE customers)
- 0.24% application rate
- 69% attrition for all applicants



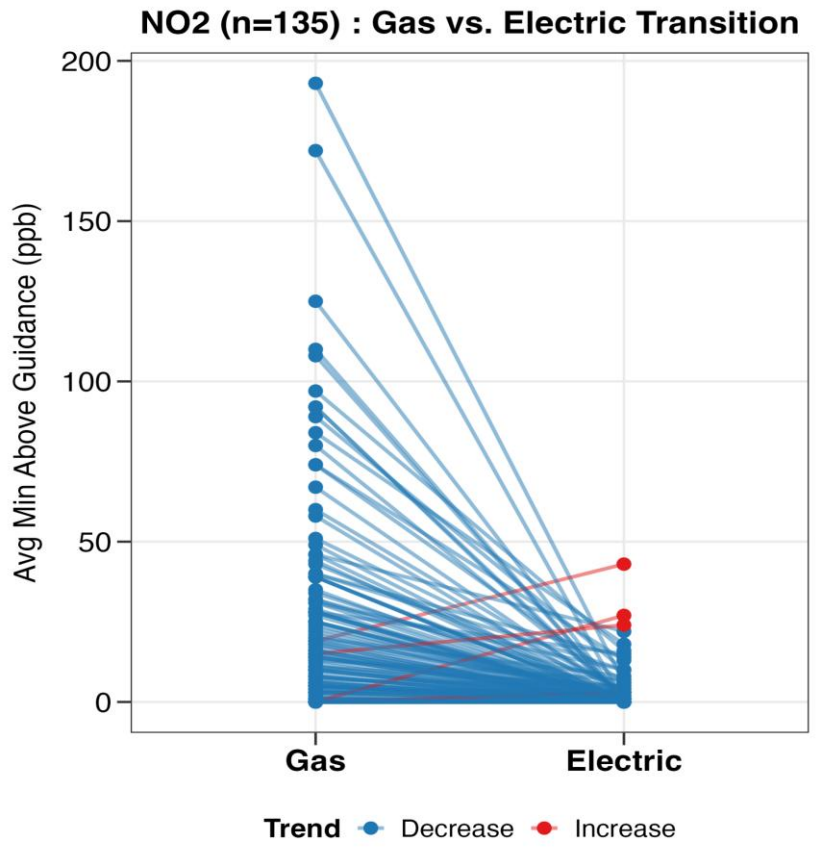
# Air Quality Results

**Significant and consistent reductions in nitrogen dioxide ($NO_2$)**

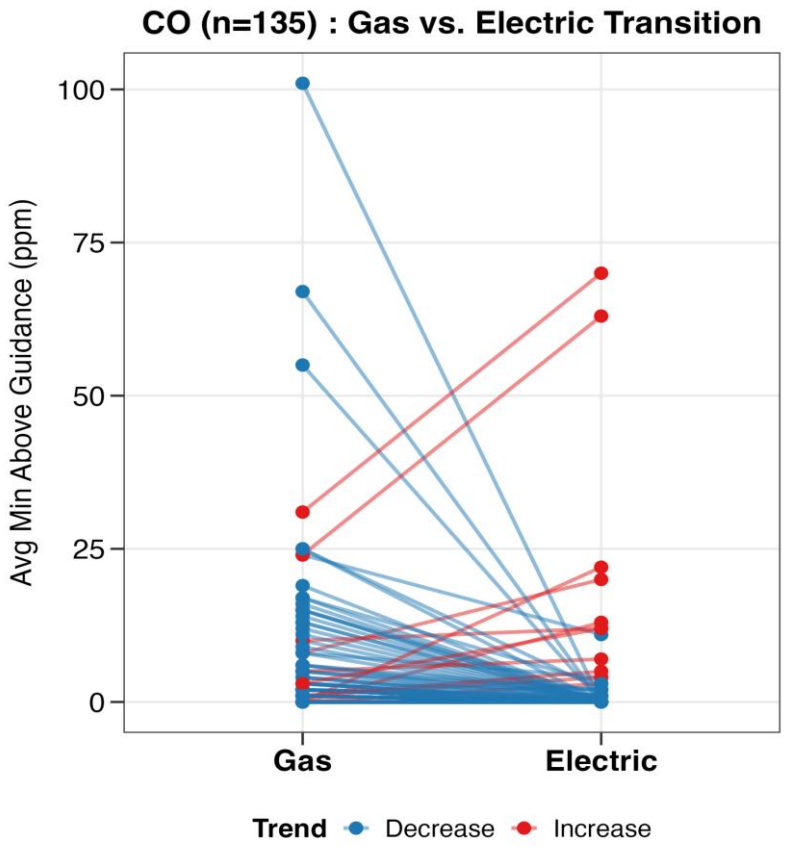
- The median $NO_2$ concentration decreased by 70%, indicating tha a typical household experienced substantial reduction.
- Median minutes above EPA threshold declined from 13 to 0 minutes per day (P<0.0001)

**Reductions in carbon monoxide (CO) were moderate**

- Median CO concentrations **decreasing by 17%**
- Median minutes above EPA threshold **declined from 1 min/day to 0 min/day** ($p < 0.0001$)




Average minutes per day with $NO_2$ concentrations exceeding the 101-ppb threshold.




Average minutes per day with CO concentrations exceeding the 9.5 ppm threshold

# Next Steps

- Staff will apply learnings from the Pilot to future program planning and design efforts
  - Better understanding of electrical constraints across building stock in Ava's service area
  - Insights into electrification project costs, permitting constraints, and project timelines for better contractor coordination
  - Program offerings that gain more customer interest and program participation
- Remaining budget (~$8.5MM) can be reinvested into future building electrification programs (e.g. potential heat pump water heater or heat pump HVAC programs)
- Berkeley Air Monitoring Group continues to advance health-focused research on air quality and stove electrification under a CEC grant, in coordination with the Equitable Building Decarbonization Program

# Thank you!

Dan Bertoldi
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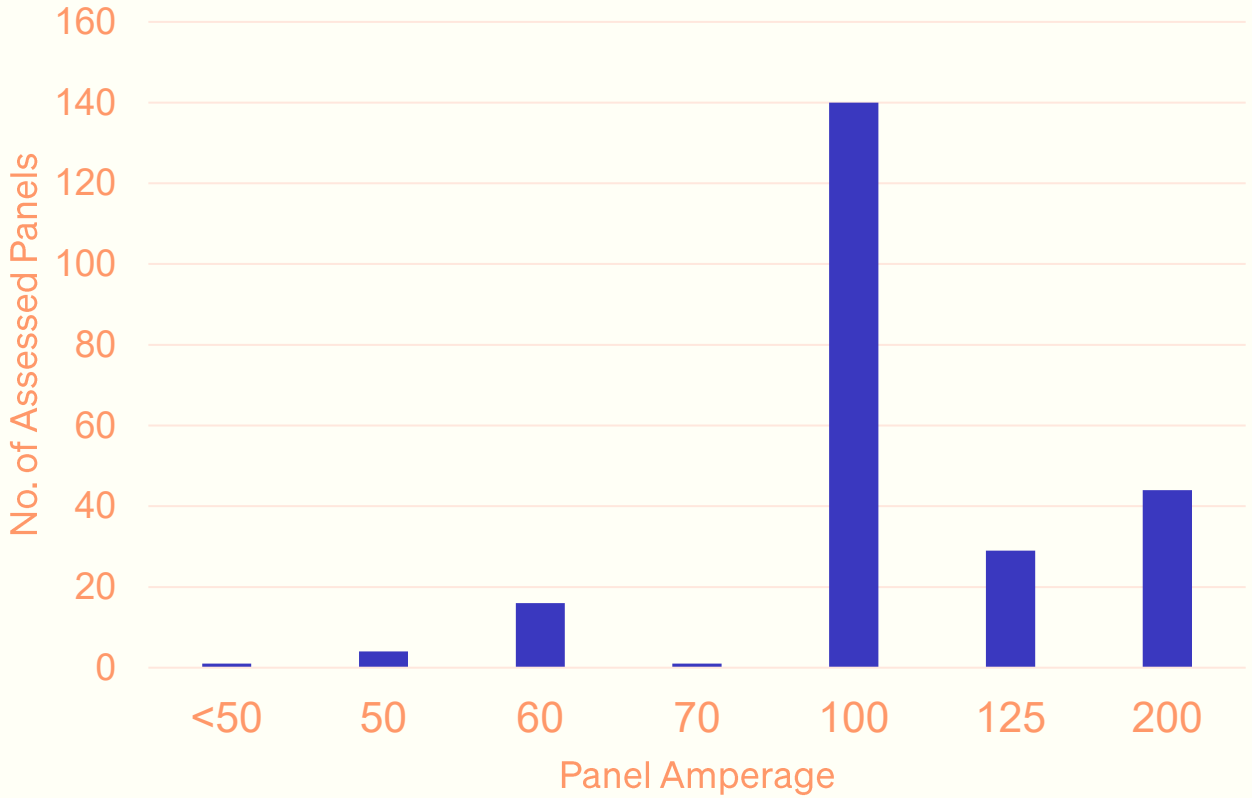
# Panel and Electrical Insights

## Panel Capacity Observations




## Highlights

- 22% of total assessed homes (324) were cancelled because of panel and/or electrical issues
  - 14% unsafe panel/electrical (44)
  - 8% panel capacity (25)
- All completed projects were at homes with 100 amps+
  - It was not feasible to electrify with less than a 100-amp panel
- Recalled/unsafe panel brands include Zinsko, Stab-Lok, Sylvania, and Federal Pacific
- We also encountered melted breakers, pest infestations in panel box, missing panel enclosures, etc.

# Pilot Interest by Jurisdiction

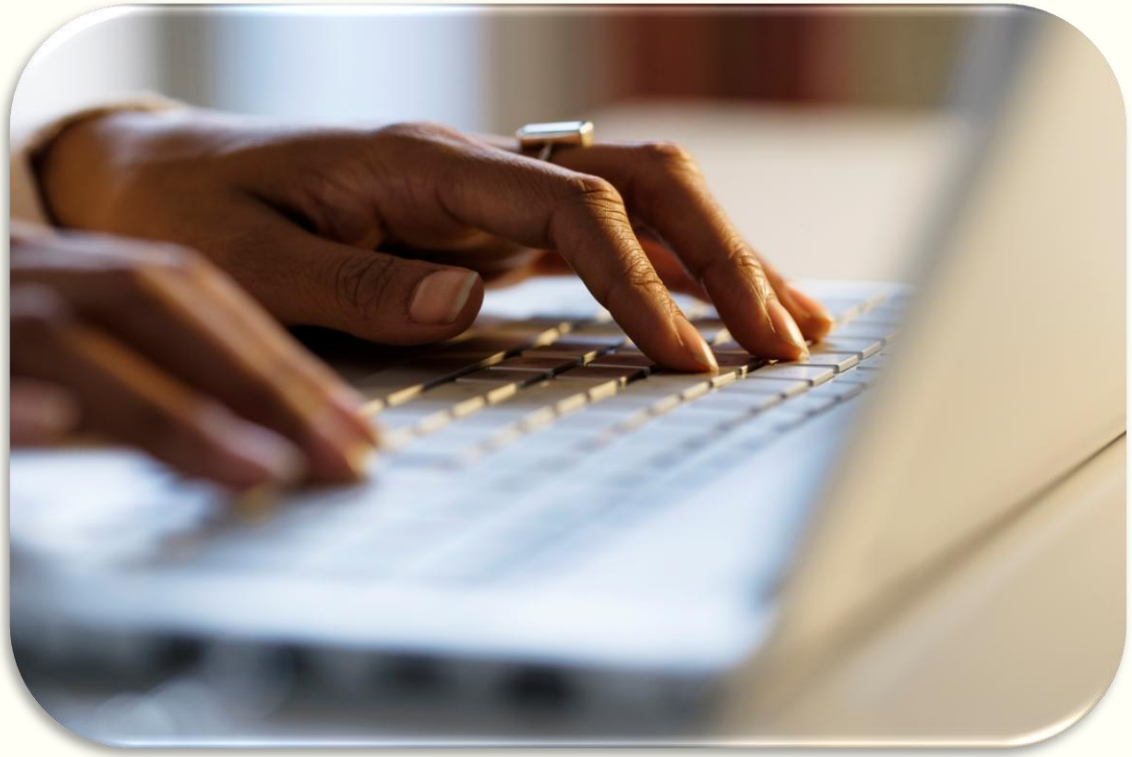
| Jurisdiction | Approved Applications | Completed Installs | % Completed Projects by City |
|---|---|---|---|
| OAKLAND | 156 | 58 | 35% |
| STOCKTON* | 115 | 33 | 20% |
| FREMONT | 29 | 17 | 10% |
| HAYWARD | 36 | 14 | 9% |
| SAN LEANDRO | 24 | 13 | 8% |
| BERKELEY | 26 | 11 | 7% |
| UNINC ALAMEDA CO | 21 | 5 | 3% |
| TRACY | 17 | 3 | 2% |
| UNION CITY | 7 | 3 | 2% |
| EMERYVILLE | 3 | 1 | 1% |
| LATHROP* | 7 | 1 | 1% |
| NEWARK | 6 | 1 | 1% |
| ALBANY | 2 | 1 | 1% |
| PLEASANTON | 1 | 1 | 1% |
| DUBLIN | 1 | 0 | 0% |

*Pilot made available to these cities in May 2025

## Highlights

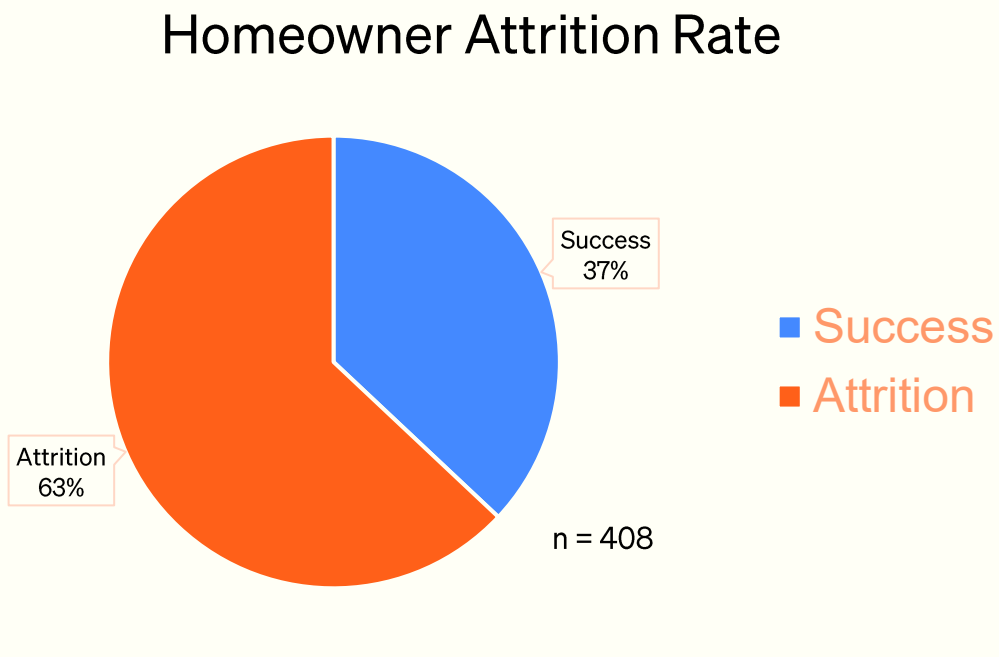
- Stockton achieved 33 installs (20%) in just 4 months
- Stockton and Oakland account for more than half of installs – these cities had the highest CARE/FERA populations and highest concentration of asthma rates
- Staff was able to tap into the (designated) affordable housing market in Fremont with assistance from City staff

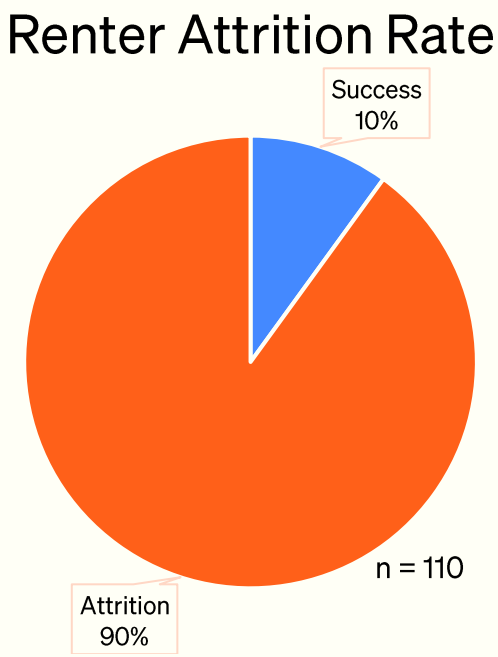
# Outreach Email Statistics



- Emails Delivered - 212,000
- Open Rate - 24,555 (11%)
- Click Through Rate - 1,410 (0.66%)
- Application Rate - 518 (0.24%)

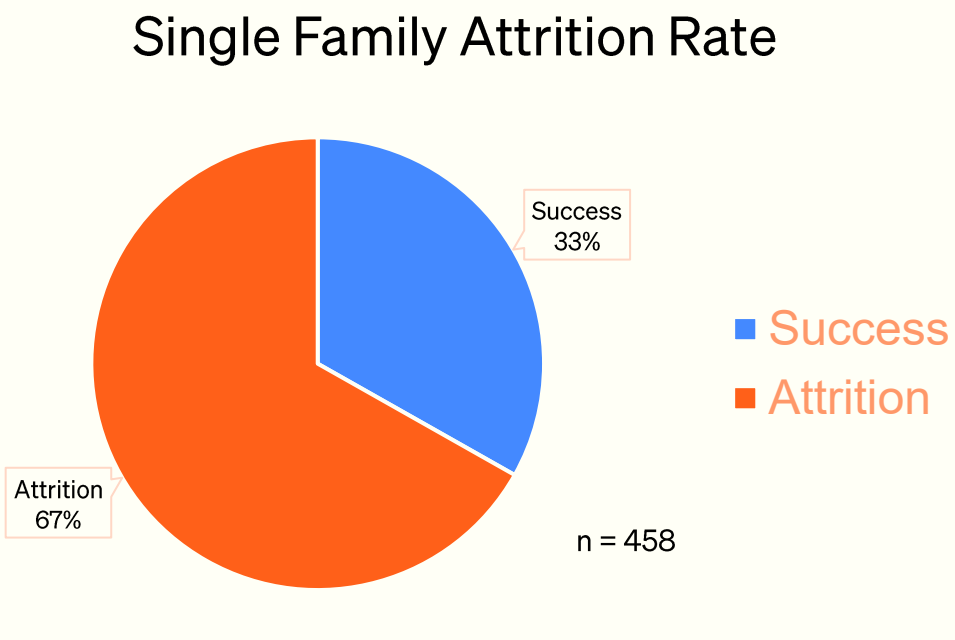
# Attrition Rate
# Renters vs. Homeowners

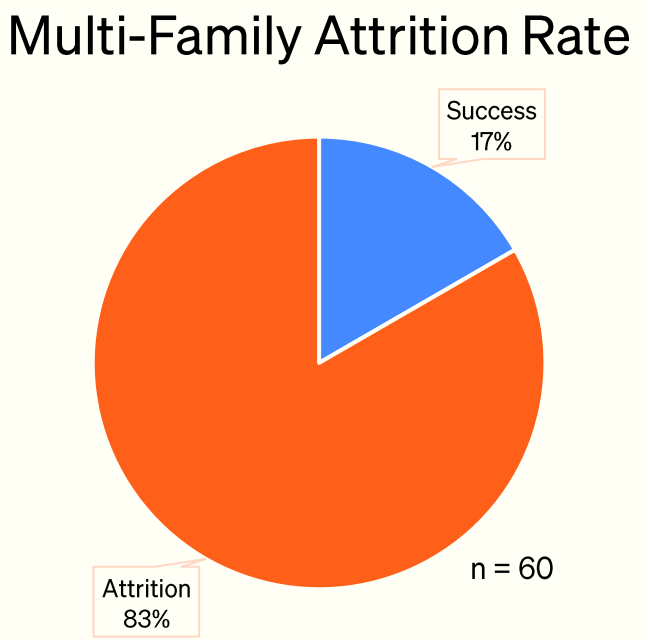



- Attrition was 90% for renters compared to 63% for homeowners.
- 26% of renting participants did not move forward because of panel or electrical issues, compared to 10% of homeowner participants

# Attrition Rate
# Single Family vs. Multi-family




- Attrition was 83% for multi-family buildings compared to 67% for single-family homes.
- 27% of the multifamily homes observed didn't move forward because of panel or electrical issues, compared to 12% of homeowners

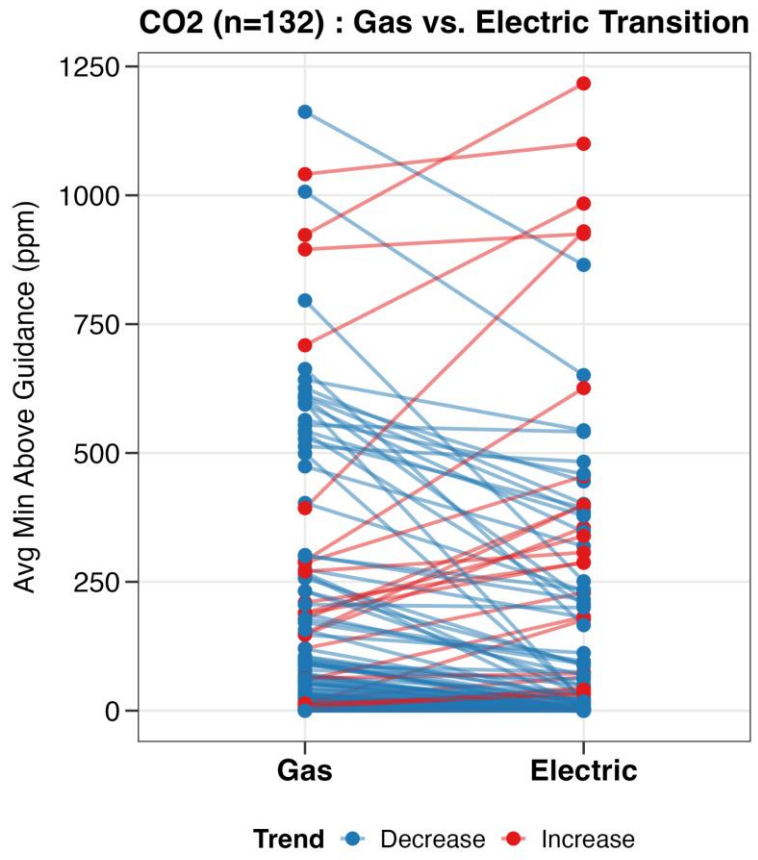
# Air Quality Results

**Carbon dioxide ($CO_2$) remained stable**

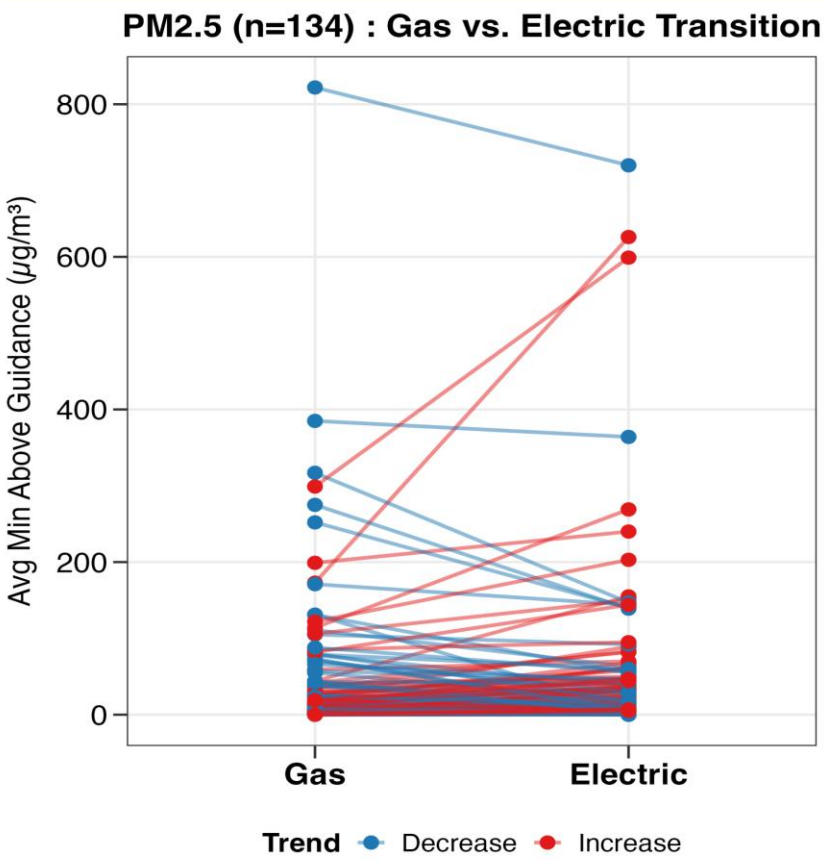
- Carbon dioxide concentrations remained largely stable following the stove transition. **Median $CO_2$ concentrations decreased slightly (4%),**

**Particulate Matter ($PM_{2.5}$)**

- High variability, with $PM_{2.5}$ being influenced by factors beyond stove fuel, including cooking practices, ventilation, and outdoor air infiltration.




Average minutes per day with $CO_2$ concentrations exceeding the 1100 ppm threshold (right).




Average minutes per day with $PM_{2.5}$ concentrations exceeding the 35.5 µg/m³ threshold (right).

# Direct Install Program Costs

| | Avg. Cost per Completed Project | Total Cost |
|---|---|---|
| **Direct Project Costs*** | $5,050 | $818,155 |
| **Admin⁺** | $2,062 | $334,024 |
| **Total** | $7,112 | $1,152,179 |

*Includes costs for equipment, labor, assessments, and cookware

⁺Includes total admin costs program-wide

# Key Observations: Site Conditions

- A major factor for the high attrition rate was existing electrical infrastructure.
  - Expect pre-existing site challenges for the targeted customer segment: uncovering electrical/panel issues and code violations was common.
  - A disproportionate number of renter and multifamily projects were cancelled because of electrical issues.
  - Stove electrification was not possible with less than 100 amps of total panel capacity.
  - Almost half of projects required installation measures beyond “standard project”, increasing the installed cost for those customers (i.e. required tandem breakers, circuit sharing devices, etc.)
- Virtual assessments may be a solution to reduce unnecessary site visits by uncovering electrical issues.
- Adding a panel replacement measure would substantially decrease attrition, but at a high cost. This would have the most impact on renters or customers who live in multifamily buildings.